

What is claimed is:

1. A circuit protector comprising:

a substrate;

a conductive layer formed around said substrate;

a narrowed portion formed in a part of said conductive layer;

a terminal formed at both ends of said substrate,

wherein said substrate has pores for 1 - 30 % area per unit surface area at least on a surface and a vicinity of the surface. Said percentage of pore being defined as a proportion of pores appearing on a polished surface per unit area.

2. The circuit protector of claim 1, wherein said conductive layer is a laminated structure with copper or its alloy laminated on top layer.

3. The circuit protector of claim 1, wherein said substrate is one of a polygonal pillar, an elliptic pillar and a round pillar.

4. The circuit protector of claim 1, wherein said substrate is a square pillar, and a groove is formed on at least one face containing said narrowed portion.

5. The circuit protector of claim 1, wherein said substrate has a stepped lower level in the middle portion between said ends, and said narrowed portion is formed in said middle portion.

6. The circuit protector of claim 1, wherein said substrate is provided with a groove formed in a helical shape, and said narrowed portion is formed at the vicinity of both ends of said groove.

7. The circuit protector of claim 1, wherein said groove has a width of $6\ \mu\text{m}$ - $45\ \mu\text{m}$.

8. The circuit protector of claim 1, wherein said narrowed portion has a width of $10\ \mu\text{m}$ - $40\ \mu\text{m}$.

9. The circuit protector of claim 1 further comprising a fusion accelerator provided on said narrowed portion.

10. The circuit protector of claim 1 further comprising a protection material covering at least said narrowed portion.

11. The circuit protector of claim 1 further comprising a protection material covering said groove.

5 12. The circuit protector of claim 1 meeting dimensional requirements specified below;

$$L1 = 0.5 - 2.2\text{mm}$$

$$L2 = 0.2 - 1.3\text{mm}$$

$$L3 = 0.2 - 1.3\text{mm}$$

10 where, L1 is an overall length, L2 a width, and L3 a height of the circuit protector.

13. The circuit protector of claim 1, wherein said substrate has a surface roughness of $0.15\text{ }\mu\text{m} - 0.8\text{ }\mu\text{m}$,

15 where the surface roughness is a center line average roughness specified in JIS B0601.

14. The circuit protector of claim 1, wherein a cross sectional shape of the terminals is polygonal and a mounting face to a circuit board is one face of the terminal other than one face that contains the shortest side of said polygon.

20 15. The circuit protector of claim 14, wherein said narrowed portion is disposed on a face that is not opposing to said circuit board, when the circuit protector is mounted thereon.

16. The circuit protector of claim 14, wherein said polygonal shape is a rectangle, and a face containing the longer side opposes to said circuit board, when the circuit protector is mounted thereon.

25 17. The circuit protector of claim 16 meeting the dimensional requirements specified below,

$$0.40 < (L2 \div L3) < 0.90$$

where, L3 is a width of longer side of said rectangle, L2 a width of shorter side of said rectangle.

18. The circuit protector of claim 1, wherein a cross sectional shape of said terminal is elliptic, and a face parallel to the major axis of said elliptic shape opposes to a circuit board, when the circuit protector is mounted thereon.

5 19. The circuit protector of claim 18, wherein said narrowed portion is disposed on a place that is not opposing to said circuit board, when the circuit protector is mounted thereon.

10 20. The circuit protector of claim 1, wherein said conductive layer is provided with a groove in a location between said narrowed portion and one of said terminals, and a groove in a location between said narrowed portion and another one of said terminals, at least one of said grooves is extending around the substrate surface and said at least one groove is bridged at a part by a conductive member for electrical conduction.

15 21. The circuit protector of claim 20, wherein said conductive member is either one selected from the group consisting of a conductive paste, a solder and an electro-conductive material in a stick, wire or sheet form.

20 22. The circuit protector of claim 1, wherein said conductive layer is provided with a groove in a location between said narrowed portion and one of said terminals, and a groove in a location between said narrowed portion and the other one of said terminals, the grooves are extending around the substrate surface and each of said two grooves is bridged at a part by a conductive member for electrical conduction.

23. The circuit protector of claim 22, wherein said conductive member is either one selected from the group consisting of a conductive paste, a solder and an electro-conductive material in a stick, wire or sheet form.

25 24. A mounting structure of a circuit protector having a fusing portion onto a circuit board, wherein said fusing portion does not oppose to said circuit board, when a circuit protector is mounted thereon.

25. The mounting structure of a circuit protector of claim 24, said circuit protector comprising:

a substrate,
a conductive layer formed around said substrate,
a narrowed portion formed in a part of said conductive layer, and
a terminal formed at both ends of said substrate.

5 26. The mounting structure of a circuit protector of claim 24, wherein
said fusing portion is positioned at substantially right angles to said circuit
board.

10 27. The mounting structure of a circuit protector of claim 25, wherein
said terminal has a rectangular shape in the cross section, and a face having a
longer side opposes to the circuit board, when the circuit protector is mounted
thereon, while a face having the shorter side stands as side face.

15 28. The mounting structure of a circuit protector of claim 25, wherein
said conductive layer is provided with a groove in a location between said
narrowed portion and one of said terminals, and a groove in a location between
said narrowed portion and another one of said terminals, at least one of said
grooves is extending around the substrate and said at least one groove is bridged
at a part by a conductive member for electrical conduction.